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claiming to have the power to divine underground water near the surface by means of a forked stick. That all who pretend to have this power of divination are intentional deceivers, I have always doubted. Ever before seeing "water-witching" performed, I had been of the opinion that there must be, as Prof. Czermak calls it in his lectures on *hypnotism*, "a not *well or not clearly-observed fact*." In vain I sought for an explanation of the phenomenon. Works treating on the solution of popular superstitions did not give the least explanation. Mayo, in "Truth in Popular Superstitions, Divining-Rod and Witchcraft," comes to no solution of the problem; he experiments with the rod, but does not find the real cause. An article in a number of the St. Louis *Globe-Democrat* in March, 1888, on "Divination," does not solve it, in spite of all endeavors to do so.

Whether anyone else has made the observations herein stated, I do not know. They were made by a friend of mine, Werner A. Stille, Ph.D., Principal of the Baden Schools, Baden, St. Louis, Mo.; and myself.

I saw "water-witching" performed for the first time some ten years ago, by an old honest farmer, who believed in it as gospel truth. Walking by the side of the performer, it became at once clear to me that there was a case of self-deception.

It may be hardly necessary to give a description of the divining rod. The forked hazel or the forked twig of a peach tree are in high esteem by those who practice "water-witching," although any other forked twig will do. Both prongs of the rod have to be thin, of nearly equal thickness, and about two feet in length. An end is taken in each hand, the arms extended forward, and held stiff; the hands are kept at about the height of the hips, and turned outward, so that the closed fingers are above and the thumbs at the outside of the hands; the rod is grasped tightly and held horizontally, while walking over the ground to be explored for water.

Both arms and hands thus in a strained position are to regain a more easy position, but the rod must be held tightly. As the turning of the arms and hands is either by relaxation of the muscles or involuntarily, an invisible power seems to be active in twisting the rod out of the operator's hands. In the endeavor of the muscles to regain their natural position, the hands turn somewhat, and by observing them closely it will be seen that by this involuntary movement of the hands, caused by the relaxation of the muscles, the rod is bent downward, and in some instances with so great a force that it is twisted in the hand, and one or the other end will break.

And surely water will be found if "water-witching" is exercised in places where underground water near the surface is in abundance.

Try the experiment, which is easy to perform, and you have a very fine illustration of a "not well or not clearly observed fact."

METEOROLOGICAL SUMMARY FOR THE YEARS 1887 AND 1888.

PREPARED BY PROF. F. H. SNOW, UNIVERSITY OF KANSAS, FROM OBSERVATIONS TAKEN AT LAWRENCE.

1887.

The year 1887 was marked by a cold winter and a warm spring, while the summer and autumn were of nearly the average temperatures. The total rainfall fell but little short of the average amount, but its distribution was unfavorable to corn and other midsummer crops. A serious deficiency in July found the ground nearly destitute of moisture, on account of the eleven-inch deficiency of the year 1886, and in less than two weeks what promised to be the most abundant corn crop ever produced in the State was reduced to very small proportions. The abundant crops of oats, hay, potatoes and other spring and autumn products gave the State of Kansas a great advantage over some other States, which suffered from a more serious drouth, without similar compensations.

Other characteristics of the year were, the small percentage of cloudiness, the moderate wind-velocity, and the astonishingly low barometer of February 3d (the lowest barometric reading on our twenty-years-record).

TEMPERATURE.

Mean temperature of the year, 53.12°, which is .20° above the mean of the nineteen preceding years. The highest temperature was 102°, on July 17th; the lowest was 20° below zero, on the 10th of January, giving a range of 122°. Mean, at 7 A. M., 47.56°; at 2 P. M., 61.87°; at 9 P. M., 51.52°.

Mean temperature of the winter months, 26.35°, which is 2.56° below the average winter temperature; of the spring, 56.32°, which is 2.67° above the average; of the summer, 75.77°, which is .11° below the average; of the autumn, 54.04°, which is .09° above the average.

The warmest month of the year was July, with mean temperature 79.79°; the warmest week was July 11th to 17th, mean 86.75°; the warmest day was July 17th, mean 89.50°. The mercury reached or exceeded 90° on 40 days, (just the average number,) viz.: one in May, 5 in June, 18 in July, 10 in August, and 6 in September. There was only one day on which the temperature reached 100°—July 17th.

The coldest month was January, with mean temperature 20.48°; the coldest week was January 1st to 7th, mean 4.36° above zero; the coldest day was January 8th, mean 7.13° below zero. The mercury fell below zero on 16 days, of which 9 were in January, 3 in February, and 4 in December.

The last hoar frost of spring was on April 24th; the first hoar frost of autumn was on October 12th; giving an interval of 171 days, or nearly six months, entirely without frost. This is 16 days longer than the average interval.

The last severe frost of spring was on April 4th; the first severe frost of autumn was on the 24th of October; giving an interval of 203 days, or nearly 7 months, without severe frost. The average interval is 198 days. No frosts during spring and autumn caused damage to crops of grain and fruit; but the low temperatures of January were seriously destructive to the buds of budded varieties of peaches.

RAIN.

The entire rainfall, including melted snow, was 33.84 inches, which is only .86 inch below the annual average. Either rain or snow, or both, in measurable quantities, fell on 91 days—13 less than the average. On 16 other days rain or snow fell in quantity too small for measurement.

The number of thunder showers was 23. There was but one light hail storm during the year.

SNOW.

The entire depth of snow was 25 inches, which is 3.15 inches above the average. Of this amount, 9 inches fell in January, 6 inches in February, 6 inches in March, one inch in November, and 3 inches in December. Snow fell on 28 days, on 7 of which the quantity was too small for measurement. The last snow of spring was on April 22d. The first snow of autumn was on November 23d—15 days later than the average date.

FACE OF THE SKY.

The mean cloudiness of the year was 40.91 per cent., which is 3.46 per cent. below the average. The number of clear days (less than one-third cloudy) was 192; half-clear (from one to two-thirds cloudy), 86; cloudy (more than two-thirds), 87. There were 73 days on which the cloudiness reached or exceeded 80 per cent. There were 58 entirely clear and 42 entirely cloudy days. The clearest month was October, with a mean of 24.09 per cent.; the cloudiest month was February, mean 57.86 per cent. The percentage of cloudiness at 7 A. M. was 44.45; at 2 P. M., 45.45; at 9 P. M., 32.84.

DIRECTION OF THE WIND.

During the year, (three observations daily,) the wind was from the S. W. 297 times, N. W. 240 times, S. E. 158 times, N. E. 136 times, N. 129 times, S. 64 times, E. 57 times, W. 14 times. The south winds (including southwest, south, and southeast) outnumbered the north (including northwest, north, and northeast) in the ratio of 519 to 505.

VELOCITY OF THE WIND.

The number of miles traveled by the wind during the year was 132,367, which is 3,824 miles below the annual average for the preceding 14 years. This gives a mean daily velocity of 362.65 miles, and a mean hourly velocity of 15.11 miles. The highest velocity was 75 miles an hour, on July 21st; the highest daily velocity (the second highest on our record) was 1,150 miles, on the 20th of December; the highest monthly velocity was 14,680 miles, in January. The windiest months were January, March, April, and October; the calmest months were June, July, August, and September. The average velocity at 7 A. M. was 13.42 miles; at 2 P. M., 16.61 miles; at 9 P. M., 14.16 miles.

BAROMETER.

Mean height of barometer column, 29,109 inches, which is .002 inch above the annual average. Mean, at 7 A. M., 29.131 inches; at 2 P. M., 29.087 inches; at 9 P. M., 29.108 inches; maximum, 29.792 inches, on February 3d; minimum, 28.152 inches, on February 17th; yearly range, 1.640 inches. The highest monthly mean was 29.205 inches, in February; the lowest was 29.041 inches, in June. The barometer observations are corrected for temperature and instrumental error only.

RELATIVE HUMIDITY.

The average atmospheric humidity for the year was 69.8; at 7 A. M., 79.6; at 2 P. M., 54.7; at 9 P. M., 75.1. The dampest month was February, with mean humidity 82.6; the dryest month was April, mean humidity 61.1. There were 13 fogs during the year. The lowest humidity for any single observation was 8 per cent., on March 8th.

1888.

The chief meteorological feature of the year 1888, at this station, representing the eastern portion of Kansas, was the abundant and well-distributed rainfall. The total precipitation came within one one-hundredth of an inch of the maximum rainfall of the year 1876, and has nearly made good the deficiencies of the years 1886 and 1887.

In temperature the annual mean was below the average. This result was chiefly due to the abnormal coldness of January, March, August and October, which more than overbalanced the unusually high temperatures of April, May, July, and December. Other peculiarities of the year were the low wind-velocity, the small proportion of cloudiness, and the unusually high barometric pressure. The year 1888 was the fifth successive year of wind-deficiency. Our records of the wind show four alternating periods: Four years of excess (1873–1876); three years of deficiency (1877–1879); four years of excess (1880–1883); and five years of deficiency (1884–1888).

TEMPERATURE.

Mean temperature of the year, 52.28°, which is .65° below the mean of the 20 preceding years. The highest temperature was 99°, on August 2d; the lowest was 18°

below zero, on the 15th of January; giving a range of 117°. Mean, at 7 A. M., 46.91°; at 2 P. M., 60.79°; at 9 P. M., 50.71°.

Mean temperature of the winter months, 28.41°, which is .37° below the average winter temperature; of the spring, 52.75°, which is 1.03° below the average; of the summer, 75.18°, which is .59° below the average; of the autumn, 52.77°, which is 1.27° below the average.

The warmest month of the year was July, with mean temperature 79.52°; the warmest week was July 28th to August 3d, mean 83.77°; the warmest day was August 2d, mean 87.125°. The mercury reached or exceeded 90° on 28 days, (12 below the average number,) viz.: six in June, 17 in July, 3 in August, and 2 in September. The temperature at no time reached 100°.

The coldest month was January, with mean temperature 17.70°; the coldest week was January 14th to 20th, mean temperature 3.33°; the coldest day was January 15th, mean 11.25° below zero. The mercury fell below zero on 9 days, of which 8 were in January and 1 in February.

The last hoar frost of spring was on May 19th; the first hoar frost of autumn was on September 28th; giving an interval of 132 days, or nearly 5 months, entirely without frost. This is 24 days shorter than the average interval.

The last severe frost of spring was on April 29th; the first severe frost of autumn was on November 9th; giving an interval of 203 days, or nearly 7 months, without severe frost. The average interval is 198 days. No frosts during spring and autumn caused damage to crops of grain and fruit; but the low temperatures of January were generally destructive to peaches and cherries.

RAIN.

The entire rainfall, including melted snow, was 44.17 inches, which is 9.51 inches above the annual average. Either rain or snow, or both, in measurable quantities, fell on 83 days — 20 less than the average. On 17 other days rain or snow fell in quantity too small for measurement.

The number of thunder showers was 37. There were five light hail storms during the year — two in May, two in August, and one in October.

SNOW.

The entire depth of snow was 22 inches, which is exactly the yearly average. Of this amount, 3 inches fell in January, 2 inches in February, 2 inches in March, 12 inches in November, and 3 inches in December. Snow fell on 25 days, on 10 of which the quantity was too small for measurement. The last snow of spring was on March 27th. The first snow of autumn was on November 9th, which is just the average date.

FACE OF THE SKY.

The mean cloudiness of the year was 42.49 per cent., which is 1.71 per cent. below the average. The number of clear days (less than one-third cloudy) was 179; half-clear (from one to two-thirds cloudy), 95; cloudy (more than two-thirds), 92. There were 78 days on which the cloudiness reached or exceeded 80 per cent. There were 61 entirely clear and 42 entirely cloudy days. The clearest month was September, with a mean of 22.44 per cent.; the cloudiest month was March, mean 53.87 per cent. The percentage of cloudiness at 7 A. M. was 48.77; at 2 P. M., 44.71; at 9 P. M., 34.

DIRECTION OF THE WIND.

During the year, (three observations daily,) the wind was from the S. W. 316 times, N. W. 201 times, S. E. 205 times, N. E. 135 times, N. 101 times, E. 73 times, S. 56 times, W. 11 times. The south winds (including southwest, south aud southeast) outnumbered the north (including northwest, north and northeast) in the ratio of 577 to 437.

VELOCITY OF THE WIND.

The number of miles traveled by the wind during the year was 128,185, which is 7,751 miles below the annual average for the preceding 15 years. This gives a mean daily velocity of 350.23 miles, and a mean hourly velocity of 14.59 miles. The highest velocity (the highest ever recorded at this station) was 96 miles an hour, from 2:25 to 2:30 A. M. on August 12th; the highest daily velocity was 930 miles, on the 25th of February; the highest monthly velocity was 13,830 miles, in March. The windiest months were January, February, March, and April; the calmest months were July, August, and September. The average velocity at 7 A. M. was 13.35 miles; at 2 P. M., 16 miles; at 9 P. M., 14.58 miles.

BAROMETER.

Mean height of barometer column, 29.132 inches, which is .25 inch above the annual average. Mean, at 7 A. M., 29.149 inches; at 2 P. M., 29.114 inches; at 9 P. M., 29.131 inches; maximum, 29.983 inches, on January 15th; minimum, 28.495 inches, on March 19th; yearly range, 1.488 inches. The highest monthly mean was 29.334 inches, in January; the lowest was 28.958 inches, in May. The barometer observations are corrected for temperature and instrumental error only.

RELATIVE HUMIDITY.

The average atmospheric humidity for the year was 72.2; at 7 A. M., 81; at 2 P. M., 58.2; at 9 P. M., 77.3. The dampest month was January, with mean humidity 85.9; the dryest month was April, mean humidity 61.8. There were 15 fogs during the year. The lowest humidity for any single observation was 18 per cent., on April 22d and May 14th.

The following tables give the mean temperature, the extremes of temperature, the number of inches of rain and snow, the number of rainy days, the number of thunder showers, the mean cloudiness, the relative humidity, the number of fogs, the velocity of the wind, the mean and extreme barometer heights for each month of the year 1888, and a comparison with each of the preceding 20 years:

YEAR 1888.

Month.	*Mean temp....*	*Max. temp....*	*Min. temp....*	*Rain (inches)*	*Snow (inches)*	*Rainy days...*	*Thun. storms,*	*Mean cloudiness.........*	*Humidity.....*	*No. of fogs....*	*Miles of wind,*	*Mean barometer.........*	*Maximum barometer...*	*Minimum barometer...*
Jan	17.70	54.0	-18.0	0.93	3	5	1	41.29	85.9	4	12,435	29.334	29.983	28.641
Feb	32.74	57.0	-1.0	1.27	2	7	0	50.68	78.2	6	12,250	29.143	29.851	28.621
March	38.63	78.0	14.0	5.47	2	10	4	53.87	73.0	0	13,830	29.140	29.696	28.495
April	57.55	88.0	31.0	2.58	0	5	1	37.00	61.8	0	12,860	29.172	29.658	22.693
May	62.08	83.0	38.0	1.97	0	8	5	47.09	65.3	0	10,956	28.958	29.302	28.621
June	73.10	94.0	52.0	8.31	0	12	11	45.22	70.2	0	10,380	28.976	29.269	28.713
July	79.52	97.0	62.0	4.28	0	7	7	32.10	71.1	0	7,160	29.104	29.300	28.950
Aug	72.91	99.0	52.0	9.07	0	12	6	48.81	79.6	2	7,841	29.100	29.470	28.825
Sept	66.04	91.0	39.0	0.23	0	1	0	22.44	65.7	1	8,043	29.170	29.603	28.970
Oct	53.07	85.0	32.0	3.74	0	4	2	39.46	66.6	1	11,160	29.078	29.370	28.738
Nov	39.20	79.0	21.0	4.54	12	6	0	50.67	74.5	1	9,520	29.223	29.642	28.809
Dec	34.78	60.0	7.0	1.78	3	6	0	41.29	74.4	0	11,750	29.185	29.598	28.564
Mean....	52.28	80.4	27.4	36.8	2	7	3	42.49	72.2	1	10,682	29.132	29.562	28.720

TWENTY-ONE YEARS—1868-1888.

Year.	Mean temp....	Max. temp....	Min. temp.....	Hot days (above 90°)..	Zero days......	Days between severe frosts	Rain (inches)	Snow (inches)	Rainy days...	Thun. storms,	Mean cloudiness..........	Humidity.....	No. of fogs.....	Miles of wind,	Mean barometer..........
1868...	52.77	101.0	-16.5	43	7	160	37.48	27.50	77	......	42.35	....	.....	....	....
1869...	50.51	96.0	-5.0	23	2	167	38.51	18.00	105	33	49.23	78.2	19	....	29.103
1870...	53.70	102.0	-10.0	51	6	197	31.32	9.50	100	27	47.88	68.4	13	....	29.097
1871...	53.56	103.0	-6.0	48	8	218	33.23	29.75	120	24	47.37	65.9	6	....	29.076
1872...	51.30	97.0	-18.0	45	16	192	32.63	23.25	116	40	44.33	64.4	11	....	29.112
1873...	51.96	104.0	-26.0	48	9	165	32.94	26.50	101	17	42.46	64.0	6	154,508	29.093
1874...	53.68	108.0	-3.0	58	2	187	28.87	43.00	99	20	45.54	65.7	14	145,865	29.121
1875...	50.60	99.0	-16.5	32	12	196	28.87	5.00	106	21	44.81	66.7	5	145,316	29.102
1876...	52.76	98.0	-5.0	36	4	179	44.18	25.75	102	29	41.27	66.8	4	148,120	29.102
1877...	54.16	99.0	-9.0	20	3	217	41.09	15.50	126	39	47.12	72.6	11	113,967	29.117
1878...	55.33	98.0	-6.0	35	7	228	38.39	25.50	107	38	40.65	70.2	5	125,793	29.067
1879...	54.67	99.5	-16.0	48	13	203	32.68	10.35	90	36	40.01	67.1	10	124,768	29.127
1880...	54.01	101.0	-12.0	41	2	211	32.65	7.00	89	29	40.15	67.9	18	146,039	29.123
1881...	54.65	104.0	-8.0	68	6	210	33.27	32.50	110	31	47.42	70.1	11	141,430	29.103
1882...	54.94	105.0	-6.5	40	1	232	27.60	18.00	102	26	45.41	68.6	14	137,736	29.113
1883...	51.66	96.5	-14.0	26	8	217	40.65	12.50	106	32	45.24	69.7	18	141,164	29.135
1884...	51.30	98.0	-21.5	20	14	198	43.45	29.00	105	35	47.56	72.6	28	131,188	29.111
1885...	51.01	96.0	-14.5	27	21	176	36.97	33.00	103	31	44.57	71.3	9	123,013	29.107
1886...	52.96	105.0	-18.0	53	16	203	24.25	23.50	103	28	39.64	66.5	5	127,769	29.111
1887...	53.12	102.0	-20.0	40	16	203	33.84	25.00	91	23	40.91	69.8	13	132,367	29.109
1888...	52.28	99.0	-18.0	28	9	203	44.17	22.00	83	37	42.49	72.2	15	128,185	29.132
Mean	52.25	100.5	-12.9	40	9	198	35.10	22.00	102	29	44.12	69.0	12	135,432	29.108

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